SOME PENNSYLVANIAN FAUNAS OF TENNESSEE, EASTERN KENTUCKY, AND WEST VIRGINIA

BY

CHARLES HENRY SUMMERSON

B.S., University of Illinois, 1938

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AN ABSTRACT OF A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN GEOLOGY IN THE GRADUATE SCHOOL OF THE UNIVERSITY OF ILLINOIS, 1942

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SOME PENNSYLVANIAN FAUNAS OF TENNESSEE, EASTERN KENTUCKY, AND WEST VIRGINIA

The purpose of the study is a survey of some Pennsylvanian faunas of the Appalachian Province. The collections were made from Morgan County, Tennessee north to Vinton County, Ohio. Most of the collections are from southern Kentucky and northern Tennessee. They are from rocks of Middle Pottsville to Lower Allegheny age. There were two special objectives: (1) the study of the Upper and Lower Mercer marine zones of Ohio and their equivalents southward, as well as the study of other marine faunal zones in southern Kentucky and Tennessee which do not have counterparts in Ohio, and (2) the study of the fauna of several fresh-water zones, to which little attention has previously been given. The report is not exhaustive in number of possible collecting localities nor identification of species, but rather a reconnaisance of the problem.

The marine zones are for the most part in shales, thin argillaceous limestones, or calcareous sandstones. The specimens are usually distorted by compaction or leached and iron-stained, or very fragile, making identification very difficult. The fauna is, however, the largest thus far reported from the Pennsylvanian of the Appalachian Province. In the list all zooloogical groups found at this period are represented.

The microfauna is well preserved and common to most marine collections, but because of a limitation of time was not studied in detail. Conodonts, foraminifera (other than fusulinids) and holothurians are noted for the first time from this area. Ostracods are especially common and probably include several new species. No fusulinids were found, although they are reported from the Mercer zones in Ohio.

The macrofauna is highly varied. Brachiopods of productid and chonetid groups are especially common. Pelecypods are very numerous and of the largest number of species of the groups represented. Gastropods and cephalopods of certain genera able to live in muddy habitats are present. The species

Marginifera missouriensis (Girty) and *M. haydenensis* Girty along with *Mesolobus mesolobus* (Norwood and Pratten) are notably absent. The following is a summary of the fauna collected: 4 foraminifera, 2 porifera, 1 coelenterate, 9 crinoids, 17 bryozoa, 49 brachiopods, 98 pelecypods, 54 gastropods, 20 cepholopods, 5 trilobites, 14 genera of ostracods, 6 conodonts, 2 holothurians and some fish teeth.

Certain zones which probably represent brackish-water environment are common in the section and are characterized by the genus *Lingula.* The *Lingulas* are often accompanied by *Orbiculoidea* and occasionally pelecypods of the *Dunbarella* type. These zones are representative of local fossil lenses and are of local importance in correlation.

Fresh-water faunas are common and those studied suggest the possibility of detailed zoning of the Pennsylvanian similar to that in England and Europe. Conditions of deposition in the Appalachian coal fields and those in England seem to be very similar. Fresh-water pelecypods of types similar to those used in England for this work are very common in the southern Appalachian coal fields. These pelecypods are accompanied by a number of different forms of well preserved fresh-water ostracods that represent at least ten new species and may prove of value in correlation work.

The composite thickness of the marine zones is less than one per cent of the total thickness of the Pennsylvanian section. The remaining strata consists of shales, sandstones and coals. Sedimentation seems to have been so rapid that normal marine waters and habitat had little chance to develop. The fossils show a close relationship to the habitat and the type of sediment in which the organisms lived. Mud-dwelling and hardier forms are the most dominant. Clear quiet water types are few or absent. Small lithologic units within a marine zone are characterized by their own faunas.

The Lower Mercer marine zone of Ohio is correlated with the Dingess of West Virginia and the Kendrick shale of Kentucky. The zone is traced by unnamed zones south to Bell County,

Kentucky. The Upper Mercer marine zone of Ohio is correlated with the Winifrede of West Virginia, the Magoffin of Kentucky and the "Fossil Limestone" of Virginia. This zone is carried south by the unnamed beds to Morgan County, Tennessee. Correlation is made by a combination of evidence from the lithology, sequence of units within a marine zone, and the study of faunal assemblages rather than the use of individual index species. The time interval between the two zones is so small that little evolutionary change could be expected.

VITA

Charles Henry Summerson was born in Catlettsburg, Kentucky, on November 15, 1914.

He graduated from Springfield High School in Springfield, Illinois, in 1933, attended Springfield Junior College from 1934 to 1936, and the University of Illinois from 1936 to 1938, receiving a B.S. degree.

In 1940 he received the degree of M.S. in Geology at the University of Illinois. The years 1938-42 were spent in part time teaching in the Department of Geology at the University of Illinois while doing graduate work.

He is a member of the Sigma Xi, Paleontological Society, Illinois Academy of Science, Society of Photogrammetry, and an associate member of the American Association of Petroleum Geologists.

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